

# **MAINSTREAM OF NEUROPSYCHONUTRICOLOGY FOR PSYCHOINTELLECTUAL DEVELOPMENT OF CHILDREN AND ADOLESCENTS**

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The increasing role of nutrition in the treatment and prevention of human diseases is rather topical paradigm of the present time deserving the most steadfast attention. Nutrition in modern conditions and various modifications (diets based on natural products, nutrient mixtures, biologically active additives) is more and more actively competing with allotropy (pharmacological preparations created on the basis of chemical synthesis) and according to some analytical prognosis will force it back by the middle of the 21<sup>st</sup> century. There are both subjective (a higher compliance of “natural” mentality of consumers sometimes experiencing a prejudice against medical pharmaceutical preparations) and objective factors (“physiological origin”, absence of side effects and addiction due to “undeviation” of receptors) as well as a number of other ones to explain the phenomenon of rapid expansion of nutri- and para-pharmaceuticals. Thus it is necessary to consider that the possibilities of nutrition therapy are not limited by the use in the form of factors of medical influence of macro- and micro-nutrients, “minor” components of food, vitamins and other components influencing optimization of the organism metabolic functions. Besides, it is necessary to consider symbolic, sensory and cognitive features of food. In this connection D. A. Ugolev underlined that “nutrition has turned from a biological function of a human body to sociobiological one ... to consider all possible aspects of connection

of somatic and mental features in a person nutrition is possible only in a paradigm of trophology”.

All mentioned above preconditions (biological, physiological, theological ones) made us think that influencing everything nutrition cannot simply uninfluence the most significant and unique function of a person – intelligence function. This direction seems to be the most important one because it is regarded all over the world as having a strategic value that is proved by guardianship and home nursing carried out by such influential international organization as UNESCO.

According to the definition given by Webster dictionary, intelligence is an ability to estimate interrelation of perceived events and facts to direct the actions to achieve the planned purpose.

The complexity of the given concept is underlined by a number of more or less successful attempts to make intelligence structure by its parts. So, according to D. Cattell (1965) intelligence is subdivided into crystal one, demanding erudition and special knowledge, and liquid intelligence, reflecting natural features of the person, which does not demand erudition and special knowledge. Nevertheless, despite various interpretations, the majority of experts agree that the tests for IQ intelligence factor (a tool for intelligence measurement – it will be a further issue) reflect the ability level to think in abstracto, to discuss (99.3% of experts), the ability to make decisions (97.7%), the ability to get knowledge (96%).

The next principle question (having enormous applied value as it will become clear further) is the question of IQ conditionality. By now it is considered that 70% of intelligence is specified biologically (genetically determined) and 30% is determined by total influence of the factors reflecting environment role.

The proof of intelligence hereditary function priority is its identity in monoovular twins, closeness of intellectual features in blood relatives, decrease of intelligence in children born in closely related marriages due to depression of genes, and also conformation of intelligence transfer to posterity to Dalton rule – regresses to an average.

There are biological bases of intelligence hereditary function. They are, for example, defect structure of information transfer on synaptic level, disorder of neuron myelinic covers, shorter dendrites in “stupid” (according to H. Eysenck this is the international scientific term,

probably, demanding a gentle adaptation) children to compare with smart ones.

The history of tests for intelligence measurement deserves individual attention in the context of these issues. The first variant of IQ-test was developed by a psychologist Alfred Binet and a psychiatrist Teofil Simon (France) in 1904 and was intended to differentiate mentally retarded schoolchildren requiring special training. An English researcher Francis Galton was the first to mark the problem of psychological features measurement and to develop diagnostic means to assess the abilities. In 1912 a German psychologist W. Stern specified that the test result should be divided by the age of the person passing the test and introduced the term “intelligence quotient”. An American psychologist Lewis Terman adapted Binet-Simon intelligence measurement scale (Stanford-Binet Intelligence Scale) and operationalized mathematically the concept of intelligence quotient (IQ) introduced by W. Stern. In 1921 he initiated the first longitudinal study of intellectual giftedness.

H. Eysenck used as an example the test of geometrical figures copying which is offered to a child of certain age and suggested for reproducing.

An ordinary child of 5 years old can draw the first three figures. If he can draw 4 figures or more, his intellectual age exceeds the biological one, if he can draw less than 3 figures, it accedes. Therefore, a child’s IQ can be calculated according to the following formula:

$$IQ = YB/XB \times 100$$

So, in case of  $IQ > 100$  the child is assessed as a capable one, in case of  $IQ < 100$  – as incapable.

However, it should be considered that this formula functions up to 16 years as it is based on linear character of intellectual maturation the rates of which are minimized after 16 years and stopped after 20 years.

IQ tests for adults are more variable. Verbal, digital and graphic material is widely used in them in combination with various ways of interpretation and presentation.

In general the distribution of IQ within the population has a proportional character. It is demonstrated by the figure that the majority of people have average values of IQ, and the number of people with extremely high and low values of IQ reflecting “tails” of distribution, is rather insignificant. So, population studies have demonstrated that in half of people prevail the values of IQ ranging from 90 to 110, about

14.5% of people have IQ from 110 to 120, 7% – from 120 to 130, 3% – from 130 to 140 and only approximately 0.5% have IQ above 140. Correspondingly, 14.5% of people have IQ between 80 and 90, 7% – between 70 and 80, the others – below this level. People with IQ under 70 are classified as intellectually defective. There is even a more detailed subdivision in this group – for morons (IQ between 50 and 70), imbeciles (IQ between 25 and 50) and idiots (IQ under 25) in the terms used in psychiatric practice to estimate the level of mental retardation severity.

Probably, the most important applied aspect of the problem of intelligence measurement is whether it is possible to increase IQ? It is hardly possible to give a reasonable and impartial answer without taking into account the mentioned above H. Eysenck, whose authority and opinion we refer to. Perhaps, the role of H. Eysenck (1916–1997) in studying the problem of intelligence can be compared only to Z. Freud's role in psychology, despite all distinction of scientific directions of these outstanding researchers. H. Eysenck owns a world priority in the development of IQ tests for adults, their improvement and adaptation for professional use that influenced enormously the staff selection in institutions, distribution of vacant workplaces, selection for admission to training institutions. That was H. Eysenck who was the first to proclaim the thesis that the attempts to increase IQ by purposeful training, improvement of living conditions, formation of special classes were inefficient.

Indeed, we know true-to-life prototypes of R. Kipling's Mowgli, when children brought up together with animals beyond traditional social environment remained at the lowest level of development. However, the opposite facts are known, when the IQ of children adopted from the moment of their birth by elite families, despite all used efforts, corresponded to the intelligence of their biological parents belonging to marginal level. It seems to be possible to make in these conditions the conclusion about strict predetermination, practical fatality of the situation connected with the attempts to influence IQ. Indeed, if traditional educational efforts with all its obvious usefulness (improvement of education quality, increase of knowledge amount, formation of motivations and professional orientation) have failed, what other efforts in this sphere can put business in motion? The answer to this question is given by the classic of studying the problem of intelligence

H. Eysenck: “There is one exception from the general rule that little can be done to improve IQ: many children eat too sweet food and not enough vegetables and fruit, when they start to get a necessary dose of vitamins and mineral substances, their IQ is considerably increasing”. It should be noted that this pioneer statement was made by the scientist who was practically never engaged in the study of nutrition issues! According to H. Eysenck a special influence to increase IQ level can be made by optimization of diets in childhood and it is the more essential the younger the child is. Thus, intelligence increase in those children and adolescents whose intellectual development is actively continuing, is able to achieve 10–20% from the initial level (as it has already been mentioned, the total role of all environment factors in conditionality of intelligence accounts for not more than 30%).

This phenomenon is quite natural if to observe the history of evolution of biological type of modern person. Today anthropology has strong evidence of the fact that the growth of brain size in anthropoid apes, the ancestors of euhominid, and improvement of their skills and social institution started to develop rapidly after the transition to the mixed character of nutrition, initiation of animal meat eating, and, consequently, quick increase of animal protein share in the diet.

We completely realize that the problem raised within this article is just the invitation to conversation. Consolidation of efforts of experts in the field of clinical nutrition, neurophysiologists, pediatricians, officials of health care service, social councils and organizations is required for its further development. There are necessary reasoning and approval of mainstream of neuropsychonutriciology as a branch of nutrition science INTERFACING NUTRITIVE VALUE OF FOOD AND ITS INFLUENCE OVER THE INTELLIGENCE OF CHILDREN AND ADOLESCENTS. It is a tempting prospect, implementation of which can form the basis of humanist problem to increase the intellectual potential of all mankind.